



# **Enterprise Search Case Study: NASA Langley Google Implementation**

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Presented to Federal Knowledge Management Conference

May 2010

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› **Search All**   [Documents](#)   [Journals](#)   [Images](#)   [Books](#)

Internal

Search

[Advanced Search](#)  
[Send Feedback](#)  
[Help](#)

**[Find out what new features have been added to Langley Google!](#)**

**Other Useful Resources:**

- [Ask-A-Librarian](#)
- [Electronic Request Form \(LF31\)](#)
- [Cambridge Science Abstracts \(CSA\)](#) ↗
- [Engineering Databases](#) ↗
- [Web of Science](#) ↗

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**Page Last Modified:** September 22, 2009

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↗ indicates links to sites that are not maintained by NASA.



## Goals

- Provide engineers and scientists with the capability to **easily** find technical information helping **NASA have successful missions**
  - Provide unified search of disparate internal and external data sources to increase the use of corporate and published information.
  - Provide a simple, easy-to-use, Google-like interface and search experience
  - Decrease the time lost to ineffective search of multiple sources and interfaces ,and increase the productivity of **the** technical community



## Implementation Approach

- Partnered with Google and leveraged their technical expertise
- Partnered with Langley network and security experts
- Engaged and partnered with users/technical community
  - User interface; Source identification; Testing
- Implemented in Phases
  - Phase I: Proof of Concept
    - Center Web Sites, e-Subscriptions, google.com subset, document repositories
  - Phase II: Langley Google Beta
    - User feedback and enhanced usability; Expanded content
  - Phase III: Full Center Implementation
    - User Outreach and Communications
  - Phase IV: Enhanced Functionality and Content
    - Refining Results; User feedback; Alerts; Enhanced Statistics



## Key Sources

### Internal

- Langley Web Sites ( ~ 200)
- Langley Digital Repository – Dspace ( ~ 150,000 documents)
- Document management (Xerox Docu Share/CPX)
- Langley Phone Book
- NASA and Langley Photo Collections
- NASA Galaxie/On-line catalog
- NASA Aerospace Database  
( ~ 400,000 Full-text documents)

### External ( ~ 500 Sources)

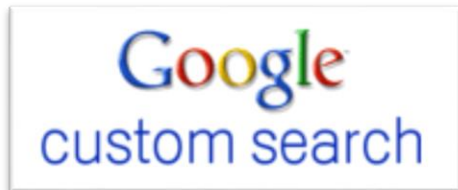
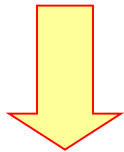
- Public NASA sites
- E-Journal and E-books subscription sites (AIAA, IEEE, Elsevier, Safari, Springer, etc.)
- Patents and Standards
- Selected government resources (DOD, DOE, NSF, NIST, OSTI, etc.)
- Research Universities
- Professional Associations
- Other selected technical resources from google.com



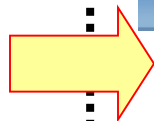
## Key Sources Integration



Unified and  
Integrated Search



Publicly Indexed Technical  
Web Sites & Info.



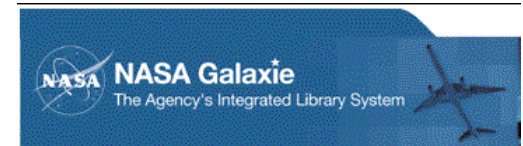
Document Management System  
60K+ Project and Other Documents



15+ search categories



Langley and NASA Web Sites



Library Catalogs / Request Forms  
Over one million item records



Electronic Journals  
Millions of full-text articles

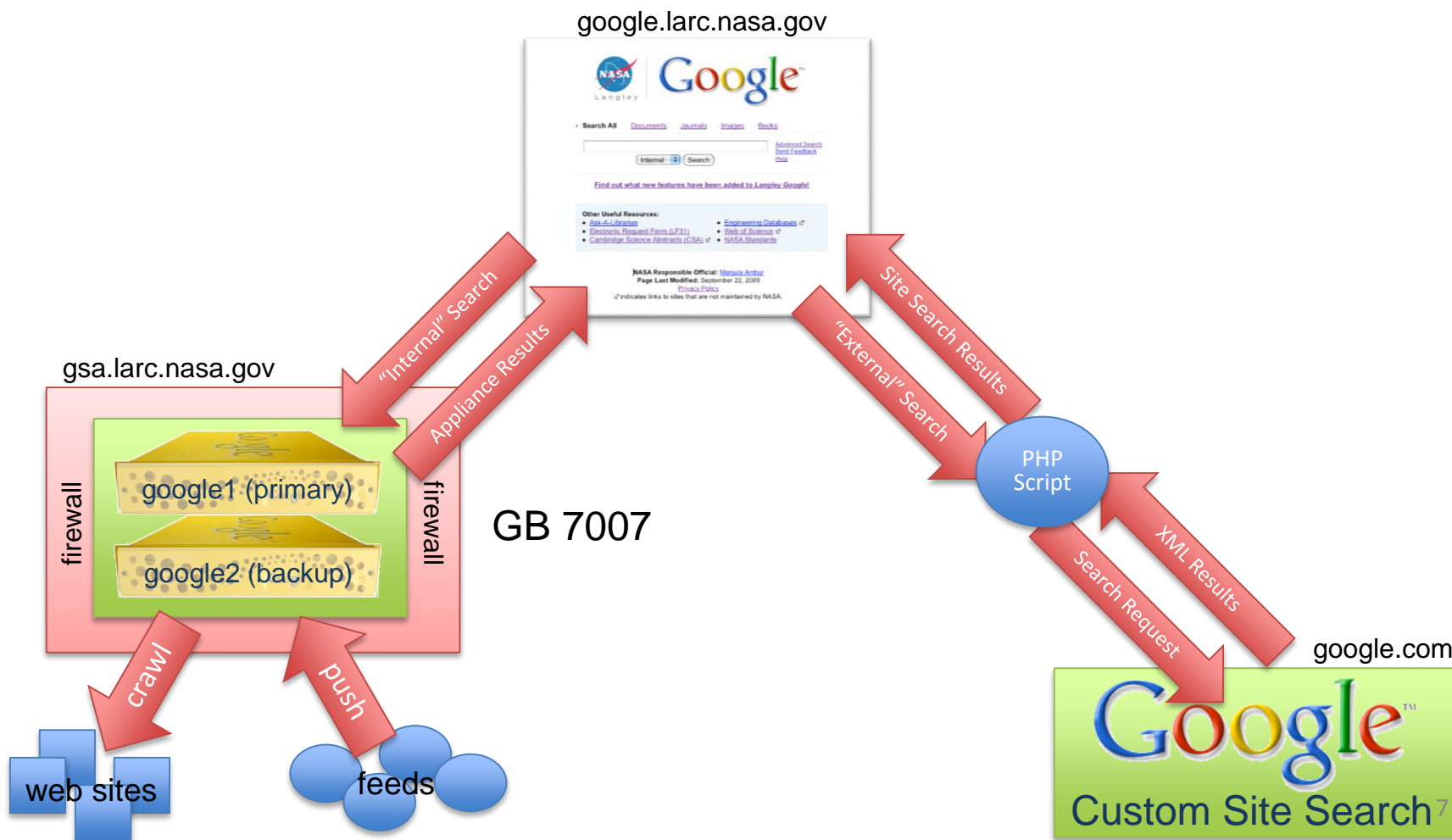


Tens of thousands of full-text reports





# Technical Architecture





# Key Features

## Integration of Internal & External Sources

Tabs for  
Internal & External

Alerts

### Refinement Options

- Clustering
- Author
- Subject
- Category

Preview of External  
Results

Inline Metadata  
For Refinement

Other Resources

Search Quality Feedback

The screenshot displays the NASA Langley Google search interface. At the top, the NASA Langley and Google logos are visible. The search bar contains the term 'airfoils' and a dropdown menu is set to 'Internal'. To the right of the search bar are links for 'Search Within Results', 'Advanced Search', 'Send Feedback', and 'Help'. Below the search bar, there are tabs for 'Internal Results' and 'External Results'. The 'Internal Results' tab is active, showing a list of search results. On the left side of the results, there are 'Collections' (All results, Documents, Journals, Images, Books) and 'Narrow your search:' options (airfoil characteristics, airfoils high, airfoils shown, airfoils tested, two dimensional airfoils, control airfoils, flow airfoils, high lift). Below these are 'Narrow by author:' options (Girault, Gough Melvin N, Kerneis, Point, Toussaint). The search results list includes titles like 'Computational Analysis of Dual Radius Circulation Control Airfoils', 'Computational Aeroelasticity of Rotating Wings with Deformable...', 'A Turbulence Model For Iced Airfoils And Its Validation', and 'A Study Of Inviscid Flow About Airfoils At High Supersonic Speeds'. On the right side of the results, there are 'Top External Matches' with links to NASA Technical Reports Server and other external sources. At the bottom of the page, there is a 'Result Page' navigation bar (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, Next) and a 'Did you find what you are looking for?' feedback box with 'Yes' and 'No' buttons. A sidebar on the left contains a list of related terms: configurations, camber, control surfaces, deicers, deicing, and fins.





# Customer Outreach and Usage

## Usage Highlights

- ~ 13,000 searches per month
- Used mostly for technical topics
- Most Liked features
  - Easy to Use: Google Like searching
  - Integration of Internal and external information
  - One Stop Searching

## Key Outreach and Communications

- @LaRC – Center-wide portal
- Demonstrations in the cafeteria
- Organizational meetings
- Search tips
- Did you know you can find...
- E-mails to targeted users
- Langley Researcher News articles



## Key Accomplishments

- Integration of web sites, document repositories and image collections
- System in operation since May 08 with no major problems
- Implemented many enhancements:
  - Refining and Narrowing results
  - Linked to sources that are not part of Google search
  - NASA Sites and full-text sites have more weight
  - Search Quality Feedback
  - E-mail alerts
- Enhancements in Progress
  - Saving and Sharing results
  - User defined key matches
  - Taxonomy /Semaphore implementation
- Federated Google Prototype with three other NASA Centers in Progress
  - Linked to NASA Enterprise Search, a NASA CIO Initiative



# Back-Up Charts



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## Results Preview

- Small preview shows what additional matches were found from “external” sources.

### Top External Matches

[Design and Performance of Low Reynolds Number Airfoils for Solar ...](#)

[http://pdf.aiaa.org/preview/CDReadyMASM08\\_1065/PV2008\\_316.pdf](http://pdf.aiaa.org/preview/CDReadyMASM08_1065/PV2008_316.pdf)

[FoilSim II 1.5a beta](#)

<http://www.grc.nasa.gov/WWW/K-12/airplane/foil2.html>

[Aerodynamic Shape Optimization of Multi-element Airfoils in Ground ...](#)

[http://pdf.aiaa.org/preview/CDReadyMASM08\\_1065/PV2008\\_327.pdf](http://pdf.aiaa.org/preview/CDReadyMASM08_1065/PV2008_327.pdf)

[Airfoils for airplanes\\*1 - Elsevier](#)

<http://linkinghub.elsevier.com/retrieve/pii/S1067991X03001871>

[Direct numerical simulations of noise generated by turbulent flow ...](#)

[http://pdf.aiaa.org/preview/CDReadyMAERO8\\_1871/PV2008\\_2861.pdf](http://pdf.aiaa.org/preview/CDReadyMAERO8_1871/PV2008_2861.pdf)

[See all external matches.](#)



# Dynamic Results Clustering

## Narrow your search:

[flow airfoils](#)

[multi element airfoils](#)

[airfoils using](#)

[transonic airfoils](#)

[reynolds number](#)

[airfoils](#)

[arbitrary airfoils](#)

[multielement airfoils](#)

[airfoils described](#)

[airfoils developed](#)

[airfoils operating](#)

- Provides dynamically formed subcategories based on the results of each search.
- Each subcategory groups similar documents together.





# Metadata Narrowing

**Narrow by author:**[Mark G. Potapczuk](#)[Martin Preston B.](#)[A. A. Khattab](#)[A. Bangalore](#)[A. Bar-Sever](#)[+ more](#)**Narrow by subject:**[Acoustics](#)[Aerodynamics](#)[Aeronautics \(general\)](#)[Air Transportation And  
Safety](#)[Aircraft Design](#)[+ more](#)**Narrow by category:**[Supersonic Airfoils](#)[Drooped Airfoils](#)[Supercritical Airfoils](#)[Thin Airfoils](#)[Circulation Control  
Airfoils](#)[+ more](#)

- Narrow by Author
- Narrow by Subject
- Narrow by Category
- Allows user to limit results to documents with specific metadata values



# NASA Thesaurus Integration

**You could also try:**

[aerodynamic](#)

[configurations](#)

[aerodynamics](#)

[aircraft design](#)

[aircraft parts](#)

[aircraft structures](#)

[airfoil profiles](#)

[aspect ratio](#)

[blades](#)

[blade-vortex interaction](#)

[blunt leading edges](#)

[blunt trailing edges](#)

- Provides list of alternative search terms based on NASA Thesaurus



## Inline Metadata

- Metadata values are displayed with results (when applicable).
- Allows user to search for other documents with same metadata values.

### [Subsonic Natural-Laminar-Flow Airfoils](#)

... of natural laminar-flow (NLF) airfoil profiles under guidance of an experimentally well-verified theoretical method for the design of **airfoils** suited to ...

**Authors:** [Dan M. Somers](#)

**Subjects:** [Aerodynamics](#)

**Categories:** [Airfoil Profiles](#) [Angle Of Attack](#) [Laminar Flow](#) [Structural Design Criteria](#) [Subsonic Flow](#)

[ntrs.nasa.gov/index.jsp?method=order&oailD=19930057783](https://ntrs.nasa.gov/index.jsp?method=order&oailD=19930057783) - 1k



## OpenSearch Plug-Ins

- Add Langley Google as your browser's search box.

